CIRCUIT DESCRIPTION

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ELECTRONIC SWITCHING SYSTEMS

NO. 3

DIAL PULSE TRANSMITTER CIRCUIT

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 The dial pulse transmitter circuit (SD-3H403-01) is a unit that can accept up to 12 circuit packs. Each circuit pack (FE403) provides a dial pulse transmitter (DPT) used by the system to pulse information to another office or PBX.

2. GENERAL DESCRIPTION OF OPERATION

2.01 When dial pulses are sent via a one-way outgoing reverse-battery trunk circuit, the DPT is connected to the trunk via the network and junctor. Under processor control, each circuit is put into the proper state for detecting or sending signals. All signaling is done via the T and R. When the final signals have been sent, the circuits are disconnected.

2.02 When sending digits to an E&M trunk circuit, an idle E&M trunk circuit is first selected in this office. While the DPT is being connected, a seizure is sent to the distant office. The E&M trunk circuit detects a start-pulsing signal from the distant office. All supervision of the distant E&M trunk circuit is done by the E&M trunk circuit in this office. The pulses that are sent to the distant E&M trunk circuit are sent by the DPT via the E&M trunk circuit in this office.

SECTION II - DETAILED DESCRIPTION

1. CONNECTIONS TO THE DIAL PULSE TRANSMITTER

1.01 When dial-pulse information is to be sent to another switching machine, an idle outgoing reverse-battery trunk circuit or an E&M trunk circuit is selected. A DPT is then selected and put into the off-hook state. The DPT is connected to the trunk circuit via the network and junctor. The junctor circuit is put into the bypass state, which causes a seizure to be sent to the distant trunk circuit.

1.02 On an E&M call, the processor directs the E&M trunk circuit in this office to seize the distant E&M trunk circuit instead of the DPT seizing it. Since this function can be quickly accomplished, the distant E&M trunk circuit has less chance of being seized by both offices if it is a 2-way E&M trunk circuit. On an outgoing reverse-battery call, a continuity check is made from the DPT to the distant trunk. A continuity check is made from the DPT to the E&M trunk circuit in this office when an E&M trunk call is made. In both cases, the continuity scan

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point is used to detect the presence of battery from the other circuit when it saturates.

2. WINK DETECTION

2.01 If the DPT is used on an outgoing reverse-battery trunk call, the junctor is placed in the bypass state and the DPT monitors the T and R for a wink (start pulsing) signal from the distant trunk circuit. Since the continuity scan point has already been saturated, a battery reversal on T and R should saturate both the continuity and the polarity scan points. This battery reversal is the wink signal. Thus, when the distant trunk circuit sends a wink signal, both scan points saturate for about 200 ms. When the polarized scan point becomes unsaturated, the DPT waits about 70 ms before starting digit transmission. This insures that the transients, due to battery reversals, have time to die out. One exception to this wink detection procedure is when the distant office is a step-by-step office. In this case, the step-by-step office is ready to receive digits but will not send a wink signal. After a certain interval has passed, the DPT will begin sending digits.

2.02 When the DPT is used on an E&M trunk call, all wink signals are detected by the E&M trunk circuit in this office.

3. DIAL-PULSE TRANSMISSION

3.01 Each DPT sends dial pulses by sending battery and ground interruptions. These interruptions (off-hooks) are sent every 100 ms or 10 pps and are controlled by the processor via the peripheral decoder. Each off-hook lasts 60 ms and each on-hook lasts 40 ms. The number of consecutive dial pulses determines the digit being sent. The processor provides an interdigital period of about 760 ms between successive digits.

3.02 Interdigital supervision is done via the DPT for only step-by-step toll or step-by-step tandem calls and during the last interdigital period of all calls. It looks for a stop-sending signal and, if one is received, the transmission of digits is delayed until a start-sending signal is received. Supervision may be provided via the DPT after a minimum of 70 ms after the last on-hook is sent.

4. DISCONNECT

4.01 After all digits have been sent, the junctor circuit is taken out of the bypass state and put into the open state. The DPT is then disconnected and idled.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 DPT supervision ranges:

Earth potential difference	± 3 volts
Maximum external loop resistance	6400 ohms
Minimum insulation resistance	30,000 ohms

2. FUNCTIONAL DESIGNATIONS

2.01 Relays

Designation	Meaning
A	Pulse Long or Short Loop
BD	Between Digits
P	Pulsing

3. FUNCTIONS

3.01 This circuit is arranged to transmit battery and ground dial pulses via the outgoing reverse-battery and E&M trunk circuits. Provisions are made for detecting the wink (start pulsing) signal and a stop-pulsing signal from a distant office on outgoing reverse-battery trunk calls.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on a keysheet, the connecting information thereon is to be followed:

(a) Master Scanner Matrix Circuit - SD-3H140-01.

(b) Distribute Point Circuit - SD-3H150-01.

(c) Network Frame Circuit - SD-3H901-01.

(d) Miscellaneous Frame Circuit - SD-3H903-01.

5. MANUFACTURING TESTING REQUIREMENTS

Intermediate Requirements

5.01 None.

End Requirements

5.02 This circuit should be tested to verify that it is wired in accordance with the schematic and wiring drawings, that specifications of the circuit requirements table are met, and that the circuit is capable of performing all functions stated in this circuit description.

6. TAKING EQUIPMENT OUT OF SERVICE

6.01 Diagnostics are run on each DPT on a routine basis. Problems are noted by the 3A CC. Excessive problem indications from a DPT cause the 3A CC to take it out of service and give a TTY printout.

6.02 The procedure for removing each DPT circuit pack from service via the TTY is found in IM/OM-3H000.

6.03 The power for each DPT circuit pack should be removed before manually removing it from the unit. This is done by removing its associated fuse.

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